

ATTACHMENT S6A1: WELL NETWORK AND MONITORING PROGRAM DESCRIPTIONS

1.0 SUMMARY OF MONITORING WELL NETWORKS AT BOEING PLANT 2

There are six classes of well networks currently installed or that will be installed in the future at Boeing Plant 2. The following text summarizes the proposed general objectives of each well network, and proposes the specific wells, sampling schedules, and constituents to be analyzed for those networks.

The six classes of well networks at Plant 2 are:

1. Shoreline Monitoring Wells;
2. Electrical Manufacturing Facility (EMF) Wells;
3. Upgradient Monitoring Wells;
4. Corrective Action / Property Boundary Monitoring Wells;
5. Corrective Action Wells; and
6. Sentinel Wells.

Groundwater monitoring objectives, well locations, screened intervals, proposed monitoring frequencies, and proposed constituent lists are summarized in the following sections for each of the six well classes.

1.1 Shoreline Monitoring Wells

The general objectives of the shoreline monitoring well network are presented in the following sections:

1.1.2 Long-Term Objectives

A long-term objective of the shoreline monitoring well network is to provide groundwater quality data at locations as close as practicable to the Duwamish Waterway that are within or downgradient of constituent of concern (COC) exceedance areas that have been identified historically and during the Corrective Measures Study (CMS) process. These data will have multiple long-term purposes, including:

- Provide groundwater quality data that will be compared to Final Media Cleanup Levels (FMCLs) for evaluations of groundwater regulatory compliance over time.
- Provide data to document groundwater discharges to the Waterway as related to verification of source control to the Lower Duwamish Waterway, including protection of sediment quality.

1.1.3 Short-Term Objectives

Short-term objectives of providing specific data for a predetermined number of monitoring events that will be used to evaluate continued monitoring for specific COCs or constituents of potential concern (COPCs). Specific short-term objectives are noted in the following bullets:

- Continued nickel analysis will be evaluated after four semiannual shoreline monitoring events are completed for all wells in the Shoreline Monitoring Well Network.
- The short-term objective of sampling for polychlorinated biphenyls (PCBs) over four shoreline monitoring events in wells PL2-613A, PL2-617A, PL2-618A, PL2-619A, PL2-620A, and PL2-621A has been completed as of March 2016 for all wells listed except PL2-613A and PL2-621A. PCBs were not detected in samples from PL2-617A, PL2-618A, PL2-619A, and PL2-620A during the four sampling events and PCB sampling has been temporarily discontinued in those four wells per interim agreements with United States Environmental Protection Agency (USEPA). The PCB sampling status of PL2-613A and PL2-621A are summarized below.
 - Well PL2-613A has not been installed as the date of this report. Following well installation and development PL2-613A will be sampled over four shoreline monitoring events. If PCBs are not detected during that time sampling for PCBs will be discontinued in PL2-613A. If PCBs are detected sampling will continue for a total of eight shoreline monitoring events and the data will be evaluated using the 95% Confidence Interval statistical test to determine if the FMCL for total PCBs was achieved at this location.
 - PCBs were detected in samples from PL2-621A; as a result, continued PCB analysis will be evaluated after eight shoreline monitoring events are completed for well PL2-621A. PCB data from the eight events will be evaluated using the 95% Confidence Interval statistical test to determine if the FMCL for total PCBs was achieved at this location.
- Continued bis(2-ethylhexyl)phthalate (BEHP) analysis will be evaluated after four semiannual shoreline monitoring events are completed for wells PL2-258A, PL2-619A, PL2-620A, and PL2-621A.
- Continued free cyanide analysis will be evaluated after four semiannual shoreline monitoring events are completed for wells PL2-615A and PL2-619A. Free cyanide was detected in the sample from PL2-619B at a concentration greater than its FMCL in March 2017, therefore, free cyanide sampling and analysis will continue at PL2-619B for a total of eight events. Data from the eight sampling events will be evaluated using the 95% Confidence Interval statistical test to determine if the FMCL for free cyanide was achieved at this location.
- Continued short-term objective sampling for total arsenic at well PL2-612AR will be evaluated after four semiannual shoreline monitoring events are completed. Long-term sampling objectives will be evaluated and proposed to USEPA based on data from wells upgradient of PL2-612AR.
- When applicable, specific shoreline wells might also serve a short-term objective of being part of the performance monitoring well network(s) for active groundwater remediation projects in Remediation Area (RA) 1, RA 2, RA 3, and RA 4.

Current shoreline monitoring well locations are shown on Figures S6A-1 and S6A-2. Screened intervals, proposed constituents, and short- and long-term objectives for existing and proposed shoreline wells are summarized in Table S6A-1, Proposed Plant 2 Shoreline Monitoring Well Network Summary.

A- and B-Level shoreline wells are proposed to be sampled semiannually. There are no C-Level wells proposed for the shoreline monitoring well network. As discussed in Section 4 of the CMS report, historical data from C-Level shoreline wells demonstrate compliance with FMCLs. In addition, the C-Level of the aquifer adjacent to the Shoreline has very limited discharge to the Waterway due to its low permeability as discussed in CMS Volume I.

Gasoline-, diesel-, and motor oil-range petroleum hydrocarbons, (collectively referred to as petroleum hydrocarbons) will not be analyzed directly as part of the shoreline monitoring program. Monitoring for petroleum hydrocarbons in groundwater is based on the well-established FMCLs for the benzene, toluene, ethylbenzene, and xylene (BTEX) and naphthalene components of petroleum, which will serve as surrogates. These are the most mobile constituents of petroleum, are reported as part of the volatile organic compound (VOC) analyses (USEPA Method 8260), and are well-studied in the literature and at Plant 2.

Adaptive Management: The findings of the CMS might result in modifications to the proposed shoreline monitoring well network or to the constituents proposed for analysis. In addition, after each year of shoreline monitoring the appropriateness of the shoreline monitoring well network, sampling frequency, and the list of constituents analyzed will be evaluated in shoreline monitoring reports. Where Adaptive Management for inorganics is warranted, Boeing will work in coordination with and seek approval from USEPA to develop and implement an appropriate strategy for data evaluation and corrective action technology determinations.

2.1 EMF Wells

The EMF well network is monitored under a separate USEPA Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Order for the EMF Site that is not formally part of the Plant 2 Resource Conservation and Recovery Act (RCRA) process; however, the EMF well network extends across the Plant 2 from East Marginal Way South to the Duwamish Waterway. Thus, the EMF well network overlaps the Plant 2 Upgradient and Shoreline monitoring well networks. Synergies inherent between the monitoring networks and programs have been and will continue to be leveraged to further both efforts. The EMF network within the Plant 2 property boundary consists of two types of wells: (1) monitoring wells and (2) injection wells, which can also be monitored. EMF wells are sampled semiannually for VOCs and total organic carbon (TOC).

The objectives of the EMF monitoring wells are:

- Provide groundwater quality data to demonstrate the progress of the ongoing EMF remediation effort.
- Provide groundwater quality data at locations as close as practical to the Waterway that are within the historical footprint of the EMF plume to document groundwater quality as it approaches the Waterway. It is likely that these wells will be used as compliance monitoring wells for the EMF plume relative to protection of surface water quality.

The objectives of the EMF injection wells are:

- Allow subsurface injection of nutrient substrate mixtures.

- Provide additional sampling locations (secondary to monitoring wells) for groundwater parameter data to document the progress of the ongoing EMF remediation effort.

There are 20 EMF monitoring wells and nine EMF injection wells in the current EMF well network on Plant 2 as shown in Figure S6A-1.

Recent data for chlorinated volatile compounds (cVOCs) in EMF wells are shown in the 2-40s Area COC maps for trichloroethene (TCE), cis-1,2-dichloroethene (cDCE) and vinyl chloride, which are presented in Attachment S4B.

Potential adverse effects to groundwater caused by EMF nutrient injections have been studied and evaluated at Plant 2. The main concern was that metals concentrations, specifically iron and manganese, might be adversely affected by reducing geochemical conditions caused by nutrient injections intended to promote Enhanced Reductive Dechlorination (ERD). Data collected to evaluate that concern have demonstrated that increased metals concentrations do not occur in areas undergoing ERD at Plant 2.

The adverse effect of temporary creation of toluene in groundwater occurred in an isolated area of the EMF plume. Evaluation of the cause and effect of this issue identified that use of an energy drink containing high concentrations of an artificial sweetener as part of the nutrient substrate was the cause. Nutrient substrates containing artificial sweeteners are no longer used in EMF injection wells and will not be used at Plant 2.

3.1 Upgradient Monitoring Wells

Upgradient monitoring wells are generally located along the eastern property boundary hydraulically upgradient of former Plant 2 operations. The objectives of the upgradient monitoring well network are:

- Evaluate groundwater quality as it enters Plant 2 to detect impacted groundwater from an upgradient offsite source.
- Evaluate groundwater quality in the EMF plume as it enters Plant 2. This objective is specific to the PL2-440A, PL2-440B, and PL2-440C well cluster.

The proposed upgradient monitoring well network is composed of 23 existing wells arranged in seven 3-level (i.e., A-, B-, and C-Level) well clusters and one 2-level (i.e., A- and B-Level) well pair in the North Area as shown on Figures S6A-1 and S6A-2. North Area upgradient monitoring wells are installed in the A-Level and B-Levels of the aquifer; no C-Level wells are present or planned in the North Area.

Upgradient monitoring wells are located along the upgradient property boundary and spaced at generally consistent intervals to provide adequate coverage of Plant 2. The wells are not located to provide monitoring data for any specific potential upgradient contaminant source. EMF as an upgradient source is adequately monitored through the EMF CERCLA Order and contains one of the proposed 3-level upgradient well clusters (PL2-440A, PL2-440B, and PL2-440C) within its historical footprint (see Figure S6A-1).

Proposed constituents to be analyzed are summarized in Table S6A-2, Plant 2 Upgradient Monitoring Well Network Summary. Upgradient monitoring wells installed in the A- and B-Levels of the aquifer will be sampled annually. C-Level wells will be sampled every five years,

which is an appropriate sampling frequency for the order of magnitude lower groundwater flow velocity in the C-Level of the aquifer relative to the A- and B-Levels, as described in CMS Volume I.

Consistent with the shoreline monitoring program total petroleum hydrocarbons (TPH) will not be analyzed directly as part of the upgradient monitoring program. Samples from upgradient monitoring wells will be analyzed for BTEX and naphthalene as part of the VOC analysis, which serve as surrogates for gasoline-, diesel-, and motor oil-range petroleum hydrocarbons and are the most mobile components of petroleum.

4.1 Corrective Action / Property Boundary Monitoring Wells

The 10 proposed corrective action / property boundary wells are located along the property boundary between Boeing Plant 2 and Jorgensen Forge at the south property boundary of Plant 2 as shown in Figure S6A-1. No additional new wells are proposed for the corrective action / property boundary monitoring well network. Groundwater flow direction maps presented in CMS Volume 1 (EPI, 2017), specifically Figure 3-29, indicate that groundwater flows approximately parallel to the property boundary. Groundwater from the eastern half of the property boundary appears to flow from Boeing onto Jorgensen Forge. Groundwater does not appear to flow from Jorgensen Forge onto Boeing along the property boundary; however, localized occurrences of this might occur at a scale too small to be observed given the limited number of groundwater elevation data points on the Jorgensen Forge property in this area.

The objectives of the corrective action / property boundary monitoring wells are:

- The long-term objective of the proposed corrective action / property boundary well network is to monitor groundwater quality along the boundary with Jorgensen Forge. Groundwater flow lines along this boundary indicate that the dominant direction of flow is approximately parallel to the property boundary, but groundwater in some locations might cross the property boundary.
- Corrective action / property boundary well PL2-007AR will also serve as a compliance monitoring well for the OA-11 RCRA unit cleanup. PL2-007AR will be sampled annually for PCBs during four annual monitoring events that were initiated in March 2017, following the completion of the corrective measures for OA-11.
- The remaining nine corrective action / property boundary wells might also serve the short-term objective of compliance monitoring for future corrective actions that will be performed to remediate chlorinated VOC exceedance areas in RA 5, which were identified during the data gaps investigation.

For long-term objectives, the proposed constituents to be analyzed annually in samples from corrective action / property boundary wells are summarized in Table S6A-3, Plant 2 Corrective Action / Property Boundary Monitoring Well Network Summary. The monitoring frequency and proposed constituent lists might be modified when property boundary wells are used for their short-term objective of serving as compliance monitoring wells for future corrective actions performed during Corrective Measures Implementation (CMI).

As noted in Table S6A-3, for long-term objectives corrective action /property boundary monitoring wells will be sampled annually for VOC and metal COCs at all locations with the following exceptions:

- Wells PL2-601B, PL2-602B, and PL2-603B will be analyzed semiannually for dissolved zinc beginning in March 2017. Continued zinc analysis will be evaluated after four monitoring events are completed.
- Well PL2-007AR will be analyzed annually for PCBs, beginning in March 2017, after OA-11 corrective measures were completed. Continued PCB analysis will be evaluated after four annual PCB monitoring events are completed.

Consistent with the shoreline and upgradient monitoring programs TPH will not be analyzed directly as part of the corrective action / property boundary monitoring program. Samples from corrective action / property boundary monitoring wells will be analyzed for BTEX and naphthalene as part of the VOC analysis, which serve as surrogates for gasoline-, diesel-, and motor oil-range petroleum hydrocarbons and are the most mobile components of petroleum.

5.1 Corrective Action Wells

Corrective action wells include two types of wells that might be installed at Plant 2 to implement a corrective action; Injection Wells, and Performance Monitoring Wells. Installation and use of corrective action wells will be proposed on a remedy-specific basis during the CMI process. The types, locations, and numbers of corrective action wells that will be installed will depend on the specific corrective measures technologies that are approved by USEPA. As a result, we cannot present specific proposed corrective action well locations, types, sampling frequencies, or constituent lists for these wells.

The objectives of two types of corrective action wells are:

- Injection Wells – Installed to allow implementation of a remedy, including such elements as subsurface injection of nutrient substrate mixtures, air, or other remediation chemicals.
- Performance Monitoring Wells – Installed to provide the primary sampling locations to track the progress at active groundwater remedies. These are generally referred to as performance monitoring wells, as they provide data to evaluate the performance and progress toward regulatory compliance for an implemented corrective measure.

When a corrective action is completed, one or more of the downgradient wells might serve as a sentinel well to provide data used to evaluate if contaminant concentrations have rebounded following termination of the corrective action. It is anticipated that when a corrective action is completed the remaining corrective action wells that are not re-designated as sentinel wells will be decommissioned per Washington State Department of Ecology (Ecology) requirements for decommissioning resource protection wells.

Shoreline monitoring wells can serve a dual purpose as performance monitoring wells for a corrective action if they are in appropriate locations and have appropriate screened intervals. The use of shoreline monitoring wells as performance monitoring wells might involve modifications to sampling frequency and/or constituent lists to serve the specific goals of the corrective action.

6.1 Sentinel Wells

The requirement for sentinel wells will be proposed for individual groundwater exceedance areas based on a variety of factors including: the stability of the exceedance area; the toxicity of the COC(s) that comprises the exceedance area; the concentrations within the COC exceedance area; the mobility of the COC(s); and distance from the Waterway.

Boeing will work with USEPA to evaluate groundwater exceedance areas that potentially warrant sentinel wells. There are no specific sentinel wells currently proposed at Plant 2. If a sentinel well is warranted downgradient of a specific exceedance area the well proposed might be an existing well, if available and located and screened appropriately, or a new well.

The objectives of sentinel wells are:

- Provide a downgradient groundwater monitoring location between the shoreline monitoring well network and an exceedance area that is expanding or that cannot be determined to be stable or shrinking.
- Provide an early indication if an exceedance area is migrating downgradient so that a remedy may be designed and implemented before the impacted groundwater reaches the Waterway.
- If analytical results from a sentinel well trigger corrective actions for a groundwater exceedance area, the sentinel well will likely become one of the corrective action wells for implementation and monitoring of the corrective action.

7.1 Additional Wells

There are additional wells remaining at Plant 2 that are not currently part of an existing monitoring well network and are not proposed to be part of a monitoring well network. When the CMS is final and evaluations indicate that no likely future use is identified for a well, that well will be decommissioned per Ecology requirements for decommissioning resource protection wells.

TABLES

Volume X: Corrective Measures Study Report - Plant 2

Table S6A1-1: Proposed Plant 2 Shoreline Monitoring Well Network Summary

Well ID	Area	Aquifer Level	Screened Interval (ft. bgs)	Proposed Constituents for Short- and Long-Term Objectives	Short-Term Objectives ¹	Long-Term Objectives ²
PL2-613A	Jorgensen Forge	A	6-21 ³	VOCs, metals, PCBs ⁴	Provide data to monitor/evaluate performance of OA-11 IM and 2-66 Area chlorinated VOC corrective actions. Provide data to evaluate continued PCB analyses.	Provide data to monitor elevated chlorinated and non-chlorinated VOC concentrations near the former PL2-JF01 cluster. Provide data to monitor PCBs from OA-11.
PL2-613B		B	50-60 ³	VOCs, metals		
PL2-614A	2-66 Area	A	6-21	VOCs, metals	Provide data to monitor/evaluate performance of OA-11 IM and 2-66 Area chlorinated VOC corrective actions.	Provide data to monitor chlorinated VOC concentrations at the 2-66 sheetpile. A- and B-Level wells will be installed between the sheetpile and waterway. B-Level well will be installed deeper than the bottom of the sheetpile structure.
PL2-614B		B	50-60			
PL2-615A	2-66 Area	A	6-21	VOCs, metals, free cyanide ⁵	Provide data to monitor/evaluate performance of future chlorinated VOC corrective actions. Provide data to evaluate continued free cyanide analyses.	Provide data to monitor chlorinated VOC exceedances at the approximate location of the former PL2-013A/PL2-607A wells.
PL2-615B		B	40-50	VOCs, metals	Provide data to monitor/evaluate performance of future chlorinated VOC corrective actions.	
PL2-616A	2-66 Area	A	6-21	VOCs, metals	Provide data to monitor/evaluate performance of future chlorinated VOC corrective actions.	Provide data to monitor chlorinated VOC exceedances at the former PL2-015 well location.
PL2-617A	2-66 Area	A	6-21	VOCs, metals	None	Provide data to monitor historical PCB detections at PL2-036A and PL2-036AR and northern extent of chlorinated VOC plume.
PL2-618A	2-40s Area	A	6-21	VOCs, metals	None	Provide data near former PL2-425A location where arsenic is commonly >FMCL. The well will also monitor PCBs downgradient of the tunnel backfilled with PCB-impacted concrete. Data used to delineate northern extent of chlorinated VOCs in 2-66 Area.
PL2-619A	2-40s Area	A	6-21	VOCs, metals, free cyanide ⁵ , BEHP ⁶	Provide data to evaluate continued free cyanide and BEHP analyses.	Provide data near the historical southern flank of the EMF Plume.
PL2-619B		B	40-50	VOCs, metals, free cyanide ⁵	Provide data to evaluate continued free cyanide analyses.	
PL2-620A	2-40s Area	A	6-21	VOCs, metals, BEHP ⁶	Provide data to evaluate continued BEHP analyses.	Provide data near the historical northern flank of the EMF Plume.
PL2-620B		B	40-50	VOCs, metals	None	
PL2-621A	2-31 Area	A	6-21	VOCs, metals ⁷ , PCBs ⁴ , BEHP ⁶	Provide data to evaluate continued nickel, PCB, and BEHP analyses.	Provide data to monitor chlorinated VOC plumes identified at and upgradient of well locations during data gaps investigation. PL2-621A will also monitor PCBs downgradient of the tunnel backfilled with PCB-impacted concrete.
PL2-621B		B	40-50	VOCs, metals	None	
PL2-214A	2-10 Area	A	15-30	VOCs, metals	Provide data to monitor/evaluate performance of 2-10 sheetpile IM.	Provide data to monitor elevated metals and VOC concentrations downgradient of the 2-10 south sheetpile
PL2-214B		B	45-60			
PL2-227A	2-10 Area	A	6-16	VOCs, metals	None	Provide data to monitor elevated A-Level VOCs south of 2-10 south sheetpile.
PL2-271A	2-10 Area	A	20-30	VOCs, metals	None	Provide data to monitor arsenic concentrations that are commonly >FMCL and historical benzene concentrations that are sporadically >FMCL.
PL2-258A	2-10 Area	A	8-23	VOCs, metals, BEHP ⁶	Provide data to monitor/evaluate performance of 2-10 sheetpile IM. Provide data to evaluate continued BEHP analyses.	Provide data to monitor elevated chlorinated VOC concentrations downgradient of the 2-10 North sheetpile.
PL2-258B		B	40-50	VOCs, metals	None	
PL2-612AR	North Area	A	12-22	total arsenic ⁸	Provide data to evaluate the validity of upgradient arsenic data from data gap investigation probes ⁷ .	Provide data to support discontinuing sampling if arsenic is <FMCL for two semiannual events.

Notes:

¹Monitoring frequency and constituents for short-term objectives will be defined by corrective action work plans.

²Semiannual monitoring at shoreline well locations when monitoring for long-term objectives.

³Target screened interval. Wells PL2-613A and PL2-613B have not been installed.

⁴PCBs will be analyzed annually. Continued PCB analyses will be evaluated after four annual shoreline monitoring events are completed at PL2-613A and eight events are completed at PL2-621A.

⁵Free cyanide analyzed semiannually. Continued free cyanide analysis will be evaluated after four semiannual shoreline monitoring events are completed, eight events for PL2-619B due to a detection of free cyanide.

⁶Continued BEHP analysis will be evaluated after four semiannual shoreline monitoring events are completed.

⁷Continued nickel analysis at PL2-621A will be evaluated after eight semiannual shoreline monitoring events are completed.

⁸Continued sampling for total arsenic analysis at PL2-612AR will be evaluated after four semiannual shoreline monitoring events are completed.

VOCs = Partial EPA Method 8260 list.

Metals = As, Cd, Cu, Ni (PL2-621A only), and Zn (total fraction for As and Cu, dissolved fraction for Cd, Ni, and Zn).

S6A1 Tables 1,2,& 3Well Network tables 092717dk_dmc_dk (2).xlsx

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Table S6A1-2: Proposed Plant 2 Upgradient Monitoring Well Network Summary

Well ID	Area	Aquifer Level	Screened Interval (ft. bgs)	Constituents for Long Term Objectives	Short-Term Objectives ¹	Long-Term Objectives ²
PL2-152A	South Yard Area	A	6-16	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-152B		B	45-50			
PL2-152C		C	80-85			
PL2-622A	2-60s Area	A	6-21	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-622B		B	40-50			
PL2-622C		C	70-80			
PL2-608A	2-40s Area	A	5.5-20.5	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-608B		B	40-45		Provide data to monitor/evaluate the performance of EMF Plume corrective actions.	
PL2-608C		C	78.5-83.5			
PL2-440A	2-40s Area	A	8-18	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-440B		B	40-45		Provide data to monitor/evaluate the performance of EMF Plume corrective actions.	
PL2-440C		C	79.5-84.5			
PL2-441A	2-40s Area	A	8-18	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-441BR		B	35-45			
PL2-441C		C	76.5-81.5			
PL2-507A	2-31 Area	A	8-18	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-507B		B	35-45			
PL2-507C		C	65-75			
PL2-201A	2-10 Area	A	9-19	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-201B		B	35-45			
PL2-201C		C	65.5-75.5			
PL2-270A	North Area	A	12.5-17.5	VOCs, metals		Provide data to monitor groundwater entering Plant 2 along the upgradient property boundary.
PL2-270B		B	35-45			

Notes:

¹Wells sampled for VOCs only as part of EMF Plume monitoring.

²Annual monitoring at A- and B-Level upgradient well locations, C-Level wells sampled every five years.

VOCs = Partial EPA Method 8260 list.

Metals = As, Cd, Cu, Ni, and Zn (total fraction for As and Cu, dissolved fraction for Cd, Ni, and Zn).

Volume X: Corrective Measures Study Report - Plant 2

Table S6A1-3: Proposed Plant 2 Corrective Action / Property Boundary Monitoring Well Network Summary

Well ID	Area	Aquifer Level	Screened Interval (ft. bgs)	Proposed Constituents for Long-Term Objectives	Short Term Objectives ¹	Long-Term Objectives ²
PL2-151A	South Yard Area	A	6-16	VOCs, metals	Provide performance monitoring data for future corrective actions.	Provide data to monitor groundwater along the property line.
PL2-156A	South Yard Area	A	6-16	VOCs, metals	Provide performance monitoring data for future corrective actions.	Provide data to monitor groundwater along the property line.
PL2-601A	South Yard Area	A	6-21	VOCs, metals	Provide performance monitoring data for future corrective actions.	Provide data to monitor groundwater along the property line.
PL2-601B		B	45-50	VOCs, metals ⁴		
PL2-602A	South Yard Area	A	6-21	VOCs, metals	Provide performance monitoring data for future corrective actions.	Provide data to monitor groundwater along the property line.
PL2-602B		B	44.5-49.5	VOCs, metals ⁴		
PL2-603A	South Yard Area	A	6-21	VOCs, metals	Provide performance monitoring data for future corrective actions.	Provide data to monitor groundwater along the property line.
PL2-603B		B	44.5-49.5	VOCs, metals ⁴		
PL2-112A	South Yard Area	A	8.5-18.5	VOCs, metals	Provide performance monitoring data for future corrective actions.	Provide data to monitor groundwater along the property line.
PL2-007AR ³	2-66 Area	A	7-17	VOCs, PCBs ³	Provide performance monitoring data for completed OA-11 corrective actions ³ .	Provide data to monitor groundwater along the property line.

Notes:

¹Monitoring frequency and constituents for short-term objectives will be defined by corrective action work plans.

²Annual monitoring at corrective action / property boundary well locations when monitoring for long-term objectives.

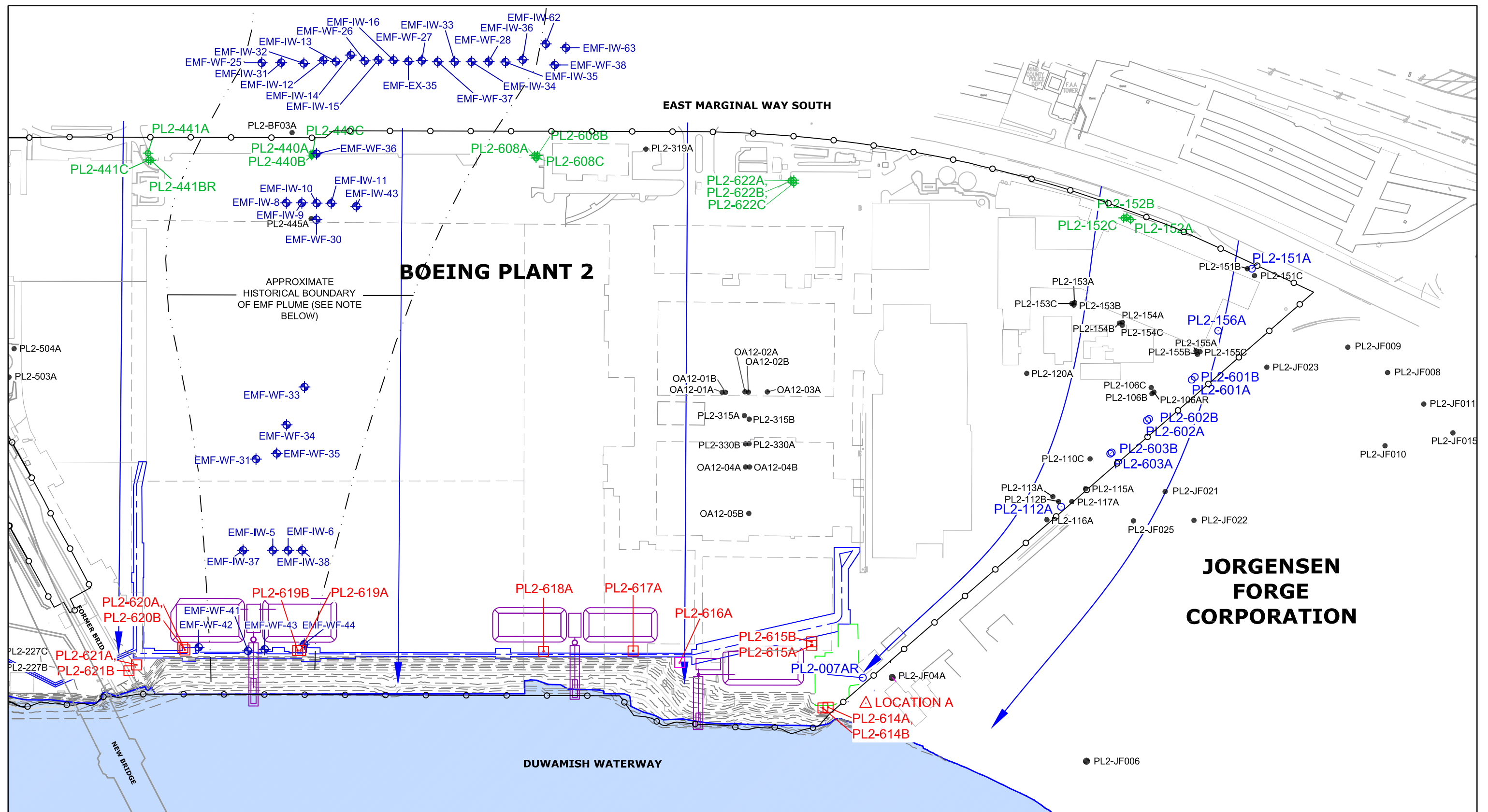
³Annual PCB sampling at PL2-007AR was initiated March 2017. Continued PCB analysis will be evaluated after four annual monitoring events are completed.

⁴Dissolved zinc analysis only. The need for continued dissolved zinc analysis will be evaluated after four monitoring events.

VOCs = Partial EPA Method 8260 list.

Metals = As, Cd, Cu, Ni, and Zn (total fraction for As and Cu, dissolved fraction for Cd, Ni, and Zn).

FIGURES



KEY:

0 50 100 200
SCALE: 1" = 200'

- PROPOSED NEW SHORELINE MONITORING WELL
- CURRENT SHORELINE MONITORING WELL
- CURRENT SHORELINE MONITORING WELL NOT PROPOSED FOR FUTURE SHORELINE MONITORING
- UPGRADIENT MONITORING WELL
- PROPERTY BOUNDARY MONITORING WELL
- CURRENT EMF WELL (IW = INJECTION WF = MONITORING)


- OTHER EXISTING WELL
- PROPERTY LINE AS SPECIFIED IN AGREED ORDER
- EMF PLUME - BASED ON 2001-2002 TRANSECT DATA
- BUILDINGS
- FORMER BUILDINGS

- SHEETPILE CONTAINMENT STRUCTURE
- STORMWATER SWALES
- DUCT BANK

THIS FIGURE WAS ORIGINALLY PRODUCED IN COLOR. REPRODUCTION IN BLACK AND WHITE MAY RESULT IN LOSS OF INFORMATION.

APPROXIMATE GROUNDWATER FLOW DIRECTION BASED ON RCRA FACILITY GROUNDWATER INVESTIGATION INTERIM REPORT, VOLUME V (WESTON, 1996) AND CONCEPTUAL HYDROLOGIC MODEL DATA GAP INVESTIGATION RESULTS (EPI, 2005)

NOTE: FOOTPRINT OF HISTORICAL EMF PLUME (2001 TIMEFRAME). REMEDIAL ACTIONS IMPLEMENTED HAVE REDUCED BOUNDARIES OF THE PLUME FROM THIS HISTORICAL FOOTPRINT.

PROJECT	BOEING PLANT 2			 ENVIRONMENTAL PARTNERS INC <i>1180 NW Maple Street, Suite 310 Issaquah, Washington 98027</i>
PREPARED FOR	THE BOEING COMPANY			
LOCATION	BOEING PLANT 2 SEATTLE/TUKWILA, WASHINGTON			
SHEET 1 of 1	DRAWN BY VPB	REVIEWED BY DCK	DATE 10/18/17	FIGURE S6A-1 PROPOSED NEW AND EXISTING MONITORING WELL LOCATIONS SOUTH PLANT 2

